

## REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

### I. Introduction

Claims 1-2 are requested to be cancelled. Claim 15 has been amended. Support for the amendment may be found in Figure 4A and in paragraph 0041 of the specification which illustrate and describe a solar module containing a single Fresnel lens attached to a back support structure. After amending the claims as set forth above, claims 3-20 and 49-56 are now pending in this application.

### II. The Rejections Should Be Withdrawn

Claim 1 has been rejected as being obvious over Barone. Claim 2 has been rejected as being obvious over Barone in view of Kaminar. Claims 3 and 49 have been rejected as being obvious over Barone in view of Gorthala. Claims 4-20 and 50-56 have been rejected as being obvious over Barone in view of Gorthala and further in view of Kaminar. These rejections are respectively traversed.

#### A. Claims 1-2

Claims 1-2 have been cancelled, thus making the rejection of claims 1-2 moot.

#### B. Claim 3

Claim 3 recites “a first means for supporting a photovoltaic cell inside a building façade envelope at a predetermined distance from the Fresnel lens such that the solar radiation is focused onto the photovoltaic cell.” Applicants note that the actual building façade envelope is not a limitation of claim 3. However, since claim 3 is written in means plus function format of 35 USC 112 paragraph 6, the recited function has to be given patentable

weight. In other words, in order to render obvious claim 3, the applied prior art would have to explicitly teach a means for supporting a photovoltaic cell inside building façade envelope.<sup>1</sup>

The Office Action asserts on page 3, last paragraph that Gorthala teaches incorporating a Fresnel lens assembly in a building façade. Applicants respectfully disagree.

Gorthala does not teach or suggest incorporating a Fresnel lens assembly in a building façade. Col. 6, lines 11-67 of Gorthala mentioned in the Office Action does not mention a building façade. Instead, col. 6, lines 35-36 of Gorthala discloses placing the Fresnel lens assembly into an enclosure with one or more transparent surfaces. However, Gorthala does not teach or suggest that this enclosure be placed into a building façade.

It is more likely that this enclosure of Gorthala is placed onto a roof of a building. Specifically, since the enclosure of Gorthala may have only one transparent surface, is very likely that this enclosure is intended to be placed onto a roof, because its back, non-transparent surface would block the windows in a building façade.

Furthermore, Figure 4 of Gorthala shows that the Fresnel lens array 7 is placed into a horizontally positioned housing 6 having what appears to be a non-transparent housing base

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<sup>1</sup> In order to establish a *prima facie* case of unpatentability of a claim containing a section 112 paragraph 6 means plus function element, the examiner must find a prior art element that actually performs the claimed function; it is not enough that the prior art's structure is capable of performing the claimed function when the prior art specifically teaches against performing such a function. See MPEP 2183. For example, the predecessor court to the Federal Circuit stated:

We cannot agree with the board that the [means plus function] claims "merely recite 'a means'." They recite a means plus a function which is not to be found in Leutwyler [the prior art reference]. They therefore do not read on that reference and are not anticipated thereby.

*In re Mott*, 194 USPQ 305, 307 (CCPA 1977). The Federal Circuit cited *In re Mott* with approval in *RCA Corp. v. Applied Digital Data Systems, Inc.*, 221 USPQ 385 (Fed. Cir. 1984). On page 389, footnote 5, the court stated

The claims here define the invention in terms of specific "means-plus-function" elements. The limitations which must be met by an anticipatory reference are those set forth in each statement of function. *In re Mott*, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977). Such a limitation cannot be met by an element in a reference that performs a different function, even though it may be part of a device embodying the same general overall concept. [Emphasis added].

8. This type of horizontal housing 6 with a non-transparent base 8 appears to be adapted to be placed onto a horizontal roof, rather than into a building façade.

Still further, col. 4, lines 4-5 of Gorthala indicate that the Fresnel lens array measures 2 feet by 3 feet. Such a large array is suitable for being placed on the roof of a building. This array would block most normal sized windows if it was placed in a façade. Thus, Gorthala does not teach or suggest placing the Fresnel lens assembly into a façade.

Likewise, the systems of Barone and Kaminar are not located inside a building façade envelope (i.e., such as in a hollow space between two windows in the face of a building). Barone and Kaminar provide no motivation to locate their modules inside a building façade envelope. Thus, even if there was motivation to combine Barone with Gorthala and/or with Kaminar, then the combination would still not teach or suggest all limitations of claim 3. Thus, claim 3 and all claims which depend from it are considered to be patentable over Barone, Gorthala and Kaminar.

### C. Claim 9

Claim 9 recites that the second cross sectional area of the solar module support structure comprises an area of  $2 \text{ cm}^2$  or less and that the length of the support structure from the first area to the second area is 30 cm or less. Claim 9 also recites that the small size of the module components allows the module to be located inside the building façade envelope.

Page 8, paragraph 2 of the Office Action relies on col. 6, lines 1-10 of Gorthala for the teaching of Fresnel lens size of 6 inches square. However, the Fresnel lenses 5 of Gorthala are incorporated into an array 7, such that twelve Fresnel lenses 5 are incorporated into each solar module housing / support structure 6 (col. 6, lines 4-6 of Gorthala). The size of the array 7 of Fresnel lenses of Gorthala is 2 feet by 3 feet (col. 6, lines 4-6 of Gorthala). Thus, the actual size of the solar module support structure 6 of Gorthala is at least 2 feet by 3 feet.

Therefore, Gorthala does not teach or suggest that the second cross sectional area of the solar module support structure comprises an area of  $2 \text{ cm}^2$  or less and that the length of

the support structure from the first area to the second area is 30 cm or less, as recited in claim 9.

Likewise, Barone and Kaminar do not teach or suggest the module size limitations that are recited in claim 9. Thus, even if there was motivation to combine Barone with Gorthala and/or with Kaminar, then the combination would still not teach or suggest all limitations of claim 9. Thus, claim 9 and all claims which depend from it are considered to be patentable over Barone, Gorthala and Kaminar

Furthermore, the dimensions recited in claim 9 are not a matter of “routine design choice” and “mere change in size”. The small module size allows the Sun’s rays to be focused to a small area on the photovoltaic cell. For example, the photovoltaic cell radiation receiving area may be 1.5 cm<sup>2</sup> or less, as recited in present claim 15. This allows the use of a small photovoltaic cell made on a semiconductor wafer by wafer scale deposition techniques. Such cells include cells with single crystal semiconductor active layers and have a much higher conversion efficiency than large solar cells with amorphous or polycrystalline active layers formed on sheet-like glass and metal substrates. For example, single crystal semiconductor active layer cells formed on a semiconductor wafer can convert 15% to 50% of captured solar energy to electricity, as recited in claim 52. Thus, reducing the size of the module provides a higher conversion efficiency.

Furthermore, the small size of the module allows the module to be placed inside the building façade envelope. In contrast, the much larger modules of Barone, Gorthala and Kaminar are not adapted to fit into the building façade envelope. Therefore, the size recited in claim 9 is not a matter of design choice or mere change in size, but provides a functional difference from the prior art. The size recited in claim 9 provides an increase in the conversion efficiency of the module and allows the module to be located in a building façade envelope.

In contrast, it appears that Kaminar discloses much larger modules having an apparent size of at least several meters. While Kaminar does not describe the type of solar cells used, it appears that these modules may be used with amorphous or polycrystalline active layer

solar cells deposited on large glass or metal substrates having a size of several square meters. Such solar cells normally have a much lower conversion efficiency, usually below 15%. Thus, Kaminar apparently does not recognize that by reducing the size of the module, the conversion efficiency can be increased.

Likewise, Gorthala teaches modules that have a size of 2 feet by 3 feet. The device of Gorthala is used for daylighting of interior spaces and does not even contain a photovoltaic cell. Thus, Gorthala also does not recognize that by reducing the size of the module, the conversion efficiency can be increased.

#### **D. Claim 15**

Claim 15 has been amended to recite a solar module having a small size and containing a single Fresnel lens. In contrast, the module 6 of Gorthala contains twelve Fresnel lenses (Figure 4 and col. 6., line 5). Likewise, the module of Barone contains an array 2 containing a plurality of Fresnel lenses 20, 21, 22 (see Figures of Barone). There is no motivation to place only a single Fresnel lens into the module of Barone and Gorthala.

#### **E. Claim 53**

New claim 53 recites that the back support structure has a substantially pyramidal or a substantially conical shape. The Office Action asserts that the support structure of Kaminar is pyramidal (page 5, last paragraph of Office Action).

Applicants submit that the back support structure of Kaminar is neither pyramidal nor conical. A pyramidal structure means that all of the sidewalls of the module have to be tapered toward a common vertex or focal point. However, as clearly seen in Figure 1 of Kaminar, the end caps 14 of the modules of Kaminar are not tapered toward the same focal point as the sidewalls (i.e., wall panels) 18. It appears that the end caps 14 actually protrude outwards rather than inwards in the modules. Thus, the back support structure of Kaminar is not pyramidal.

Figure 1 of Kaminar cited in the Office Action is a cut away view and does not show the shape of the end caps 14. Thus, Figure 1 does not show a pyramidal support structure

because it does not show all sidewalls of the support structure tapered toward a single vertex. Likewise, col. 3, lines 30-35 of Kaminar mentioned in the Office Action does not describe a pyramidal support structure because it does not state that all sidewalls of the support structure are tapered toward a single vertex.

Likewise, the back support structure of Kaminar is not conical because it does not have a circular or even an oval cross sectional shape to make a cone. The support structures of Barone and Gorthala are also not pyramidal or conical.

The present inventors realized that by making the back support structure pyramidal or conical (i.e., where the sidewall(s) extend toward the same vertex or focal point), allows the modules to be easily rotated about two axes of rotation (i.e., the “morning to evening” axis and the “Summer to Winter” axis) to better track the Sun. In other words, since the back end of the back support structure is narrow, it allows the module to be rotated in many directions in tight spaces, such as inside a building façade envelope.

In contrast, the modules of Kaminar are highly elongated with protruding end caps 14. These modules are very difficult to turn about an axis which is not parallel to the module length direction. Thus, Kaminar does not teach or suggest the module of claim 53.

#### **F. No Motivation To Combine**

Finally, there is no motivation to combine Barone, Gorthala and Kaminar as suggested in the Office Action. Barone teaches away from a solar cell system which moves to track the Sun because it is complex and costly (see col. 1, lines 30-42 of Barone). The system of Barone relies on a stationary lens array 2 to track the Sun instead.

In contrast, Kaminar teaches a system which rotates to track the Sun. There is no motivation to combine Barone and Kaminar because Barone specifically teaches away from adding components usable to rotate the module to track the Sun because they are costly and complex. Thus, one of ordinary skill in the art would not import components from the rotatable support structure of Kaminar into the stationary system of Barone.

Furthermore, Gorthala does not even teach a photovoltaic system. The system of Gorthala does not contain a solar cell. Instead, the Fresnel array of Gorthala is connected to an optical fiber to provide day light to interior building spaces. Thus, there is no motivation to combine the daylighting system of Gorthala with the photovoltaic systems of Kaminar and Barone.

### III. Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Date \_\_\_\_\_

10/26/05

Respectfully submitted,

By 

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